Mid-Stream with Phase II

A Storm Water Management Program Update

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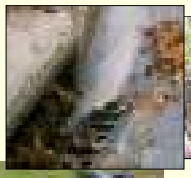
City Engineer
with assistance from CDP Engineers and GSCPC

Overview

- BAD NEWS -
  I'm here to bore you with numbers and details
- GOOD NEWS -
  I want to fill you with concepts, thoughts, ideas, and current trends to reflect upon and see how they affect Georgetown.

Overview

- Clean Water Act and the MS4 Permit
- Issues
- Our Past (permit)
- Our Future!
- Options




National Pollutant Discharge Elimination System (NPDES)

- Product of the Clean Water Act of 1972
- Point and Non-point source pollutants
- Targets operators of Municipal Separate Storm Sewer Systems (MS4s)
- Phase I 1993 – Lexington and Louisville
- Phase II 2003
  - all cities larger than 10,000 people and
  - urban area with greater than 1,000 people/mi^2.

The 'Unfunded Mandate'!!

NPDES Phase I and II Stormwater Programs courtesy of the Clean Water Act

- New set of rules to establish and follow
- New programs to develop and manage
- Increased operations and maintenance
- Increased Administration responsibilities

AND

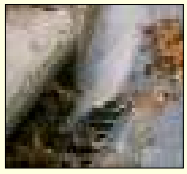
- No State or Federal support to make it happen

The Driving Forces

- Increased concern about degrading water quality caused by :
  - Sediments
  - Metals
  - Oils
  - Pathogens
  - Organics
  - Impervious area
- Sensitive Resources to Protect :
  - Royal Springs Aquifer
  - North Elkhorn Creek
- Waterways impacted by increased quantity and decreased quality of runoff as evidenced by:
  - Increased flooding
  - Designated land use impairment
  - Decreased biodiversity
  - Aesthetic and quality of life issues
    - Bank failure
    - Land loss
    - Muddy streams
    - Vegetation depletion

Where does storm water go?

When it rains, a large amount of storm water . . .


Runs off of impervious surfaces → **Enters the storm drain system** → **Is directed *straight to the stream***

Center for Watershed Protection

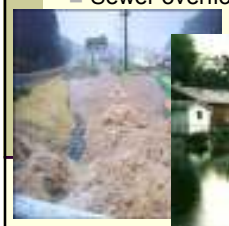
Impervious Cover Influences Water Quality

Pollutants build up on impervious surfaces and wash off into the stream system when it rains.



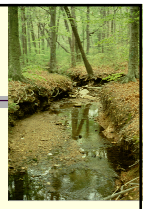
Why should we be concerned?

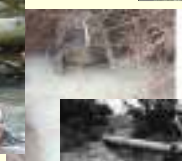
- Flooding
- Sewer overflows

Why should we be concerned?

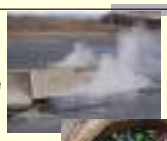
- Stream degradation
- Water quality
- Designated use non-support


Why should we be concerned?

- Cost to you
  - Infrastructure needs
  - Losses – land, property, life
  - Maintenance cost
  - Fines for non-compliance




The Birth of a New Acronym: SWMP

Storm Water Management Program

Best Management Practices (BMPs) have always been around. What was lacking were dedicated programs or requirements to effectively utilize BMPs to address storm water runoff and discharge of pollutants on a community-wide basis and raise the awareness that storm water management goes beyond the construction site and affects us all.

The Underlying Theme for Phase II Permit Term #1:

Let's give storm water management the attention we do other municipal operations through appropriate legal authority, funding, and staffing and see what happens.

Focus of First Permit Term: 2003-2008

- Lay the ground work
- Educate
- Set the program in motion
- Evaluate

The 6 Minimum Control Measures (MCM)

- Public Education and Outreach
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post Construction Storm Water Management
- Good Housekeeping for Municipal Operations

The Matrix: Phase II

Now Playing in Communities Near You!

Task	BMP- Activity Description	Milestone Product/Measurable Goal	Who is Responsible	Year 1 PY 03-04	Year 2 PY 04-05	Year 3 PY 05-06	Year 4 PY 06-07
1	PUBLIC EDUCATION AND OUTREACH						
1.1	Distribute Storm Water/NPS Pollution Brochures and Develop Public Locations	Place brochures at library, court house, Planning Commission	City, SWAC	Distribute	Distribute	Evaluate Effectiveness, Distribute	Distribute
1.2	Have Water Quality Speakers/Presentations at Schools and other interested groups	One to four presentations per year once program is ready to implement	City	Develop Program	Present	Evaluate, Present	Present
1.3	Public Service Announcements (PSA) on Local Government TV	Show on regular schedule (e.g. 2x/day) once program is developed	City	Develop PSA and program	Run PSA	Evaluate, Run PSA	Run PSA
1.4	Present Storm Water Seminars to City Council and Planning Commission	Have city engineer or planner or others present seminars on topics of NPS Pollution, water quality, stream protection, etc.	City, SWAC	Present Topic To Be Determined	Present Topic TBD	Present Topic TBD	Present Topic TBD
2	PUBLIC INVOLVEMENT/PARTICIPATION						
2.1	Develop Storm Water Advisory Committee (SWAC) to discuss community SW issues and direction of SW program	Form SWAC with broad coalition of interests from public and private sector	City, SWAC	Form SWAC, meet quarterly & develop listed programs	Develop listed programs	Evaluate listed programs	Evaluate listed programs
2.2	Stencil Catch Basins	Enlist volunteers to stencil catch basins, number to be determined during program development	City, SWAC	Complete mapping	Develop program, contact volunteer organizations	Stencil	Stencil
2.3	Tree Plantings	Enlist volunteers to plant trees, number to be determined during program development	City, SWAC	Discuss with U.S. Forest Service	Determine interest of organizations	Develop program	Implement
3	ILLICIT DISCHARGE DETECTION AND ELIMINATION						
3.1	Map public storm water system with outfalls and waterbodies	Create digital map of entire storm sewer system (major system currently being surveyed)	City	Complete surveying major system	Survey minor system	Survey minor system	Survey minor system (if not complete)
3.2	Create ordinance prohibiting illicit discharges	Develop and implement an illicit discharge ordinance	City, SWAC	Research and Develop Ordinance	Adopt Ordinance		
3.3	Provide Enforcement through Code Enforcement or other agency	Develop enforcement capabilities	City, SWAC	Research Enforcement	Begin Enforcement once ordinance in place		

Laying the Groundwork

- Educational tools
- Public participation programs
- Storm sewer system mapping
- Ordinance revisions/development
- Provisions for enforcement
  - Legal authority
  - Capacity to perform
- Illicit discharge detection and elimination plan
- Reporting, tracking, and record keeping

MCM 1: Educate

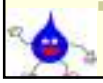
- Broadcast information
  - Brochures
  - Information on community web page
  - Presentations to community leaders
  - Presentations to civic groups
  - Public service announcement
- Training
  - Municipal employees
  - Volunteer groups for participatory activities
  - Ourselves: EPA, DOW, other community guidance

Spread the Word

- Educate – presentations, field days, trainings
- Outreach – brochures, web postings, articles
- Demonstrate what you've done –
  - Show your community that you are the role models for good stewardship
  - Inform your elected officials of the requirements and cost of compliance

MCM 2: Community Buy-In

- Volunteers, volunteers, volunteers
- Find ways to get residents and businesses involved
- Mix it up – you never know when the light bulb will finally turn on
- Rewards and incentives
  - Recognition
  - Financial returns
  - Community pride

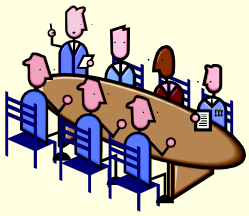


Community Buy-In

- Volunteers, volunteers, volunteers
  - Clean-Ups
  - Stenciling
  - Tree Planting

Community Ownership

- Stormwater Advisory Committee (SWAC)
  - Staff (City, P&Z, B.I., GMWSS, Parks, EMA)
  - Developers / Homebuilders
  - Contractors
  - Elected Officials
  - Citizens / Citizen Groups
  - Georgetown College
  - NRCS
  - Industry



MCM 3: ILLICIT DISCHARGE, DETECTION AND ELIMINATION (IDDE)

- **Illicit Discharge**: any discharge to an MS4 that is not composed entirely of storm water.
- **Sources**: illegal dumping, broken lines, cross connections, floor drains, SSOs, I&I, straight pipes, poor septic systems etc.

Understanding How You Might Contribute to the Problem

IDDE PROGRAM REQUIREMENTS

- Storm sewer map
- Regulatory mechanism – ordinance
- Plan to detect and address problems
  - What, when, and how to inspect
  - Sampling and analysis
  - Tracking and correcting problems
- Education
- Goals

FYI! - Kentucky Environmental and Public Protection Cabinet is promoting supplementing a IDDE Program with an aggressive Recycling Program!

WHAT THIS MEANS TO YOU

- Long-term continuous effort
- Equipment and testing needs
- Staffing
  - Field
  - Office
  - Hotline
  - Analysis
  - Training
  - Enforcement

MCM 4: Construction Site Issues

- Erosion Prevention and Sediment Control
  - Ordinance for Single Lot Erosion Control
  - Development review / enforcement by GSCPC
- Other Pollutants

MCM 4: Construction Site Issues

- Erosion Prevention and Sediment Control
- Other Pollutants

MCM 5: POST-CONSTRUCTION STORM WATER MANAGEMENT PROGRAM

- Update of Master Plan and environmental review procedures
- Development of storm water design standards and ordinance
- Process for review and approval of storm water plans for new development
- Post-construction BMP maintenance, tracking, and inspection
- Penalty provisions for non-compliance
- Training and education

Past Practices of Stormwater Management

- Identify it
- Collect it
- Route it
- Forget it

Current Trends

- Identify it
- Collect it
- Detain it
- Match peak
- Clean it
- Route it
- Forget it

POST-CONSTRUCTION IMPACTS ON STORM WATER

- Increases:
  - Impervious surface area
  - Storm water volume
  - Storm water velocity
  - Pollutant deposition
- Decreases:
  - Water quality
  - **Ground water recharge**
  - Baseflow
  - Natural drainage systems
- Consequences:
  - Increased rate and severity of flooding
  - Increased stream erosion
  - Increased sedimentation
  - Increased chemical pollution
  - Altered biological populations
  - Riparian habitat degradation
  - Increased stream temperatures

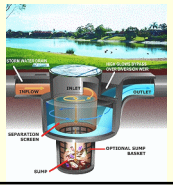
Post-Construction Management

- Water quantity
- Water quality
- Groundwater recharge
- TSS removal
- Oil and Grease
- Floatables
- BMPs
- Structural vs non-structural controls
  - Riparian buffers
- Operation and Maintenance

FYI! - Georgetown is recognized statewide for the progressive and comprehensive Post-Construction Water Quality Ordinance

WHAT THIS MEANS TO YOU

- Long-term continuous effort
- Increased costs to implement BMPs in capital projects
- Staffing
  - Expanded plan review requirements
  - Operation and maintenance management
  - Training and education
    - Employees
    - Contractors
    - Property owners
- Enforcement



WHAT THIS MEANS TO THE COMMUNITY

- Change in development philosophy
  - Focus on storm water quantity AND quality
  - Larger emphasis on environmental aspects of development
  - Low impact development
- Assignment of long-term maintenance responsibilities
  - Municipality responsible for public facilities
  - Homeowners or businesses responsible for private facilities
  - Municipality still responsible for education, tracking, and enforcement

Opportunities – Proprietary Units

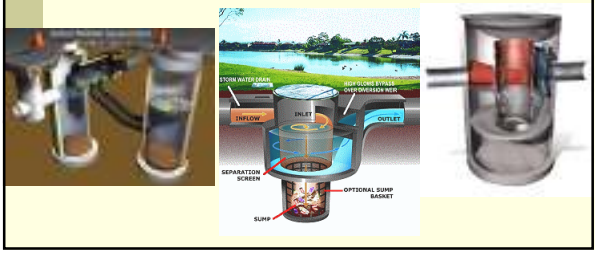
- Point of discharge
- Flow through separation
- Many/most do a good job
- No Volume reduction
- No Peak reduction
- Maintenance? Yes, must be scheduled and checked frequently to avoid failure
- Most are out of sight and therefore easy to forget about
- Costly

Examples – Vault Type

- Increasing size and complexity...and cost
- Water quality only, need additional BMP for quantity control

Examples – Manhole Type

- Increasing size and complexity...and cost
- Water quality only, need additional BMP for quantity control



Examples – Underground Detention

- Increasing size and complexity...and cost
- Water quantity only, need additional BMP for quality control

What can you do?

Opportunities – Low Impact Development (LID); on site treatment

Adopt new design practices

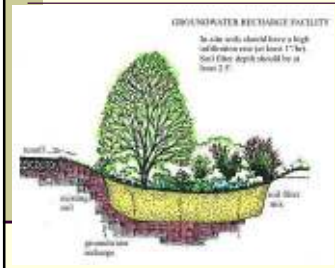
- **Soak it in**
- **Sift it out**
- **Slow it down**
- **Spread it on the ground**
- **Settle it out**

What can you do?

Consider land use effects on water quality when:

- **Planning for your community**
  - **Identify water resources**
  - **Identify water quality protection goals**
  - **Consider open space**
  - **Lanes Run Watershed**
  - **Dry Run Watershed**
- **Evaluating site designs**
- **Adopting new best practices**
  - **Consider low impact development practices**

Rain Garden Partnerships?



- LID method that infiltrates into the ground

MCM 6: Pollution Prevention

- Municipal Facilities Operations
  - Oil collection
  - Truck wash
  - Salt storage
- Street Sweeping
- Recycling Program
- Employee Training

MCM "7": Wrapping up: Evaluation

- Annual reports and compilation of numbers
  - Are we on track for compliance?
  - Were measurable goals met?
  - Are we effectively implementing the components?
  - Have there been noticeable effects?
  - What needs to change?

2008-2013: Setting the Program in Motion

- Continue to educate – variety of topics/methods
- Carry out public involvement activities
- Identify, track, locate, and fix illicit discharges
- Review and inspect: pre-, during, and post-construction
- Enforce, enforce, enforce
- Record Keeping
  - Public reporting (source, issue, actions…)
  - Inspections, NOV's, fines, permit applications…
  - Inventory of permanent BMPs – location, maintenance, responsible party…
  - #'s, #'s, #'s – needed for measurable goals, evaluation

EXECUTING THE NEW PLAN ELEMENTS

- Enforcement of Ordinances
  - Construction Run-off Inspection
  - Illicit Discharge, Detection, & Elimination (IDDE) Program
  - Post-Construction Storm Water Control Program

New for 2008-2013

- MCM 1
  - Bluegrass Pride – Partnership w/ other MS4s
  - KY Environmental Education Council
  - Better Website, Hotline
- MCM 2
  - Expand SWAC
  - Rain Garden Alliance
- MCM 3
  - Begin screening
  - Expand Resources
- MCM 4
  - Qualified Inspector Program (KEPSC)
  - Expand Resources
- MCM 5
  - Begin inspections
  - Expand Resources
- MCM 6
  - Environmental Awareness Handbook
  - Expand Street Sweeping / Leaf Pickup / Brush Pickup
  - Recycling
  - Update facilities (truck wash, etc.)
- "MCM 8" – Capital Improvements
  - Set aside funding for projects to improve our infrastructure
  - Back yard drainage problems
  - Establish Sinking Funds for routine equipment replacement

"The Big Stick"

- EPA is stepping up enforcement

"The Environmental Protection Agency and its state counterpart filed a lawsuit against the Lexington-Fayette Urban County Government on Monday for violations of the Clean Water Act due to the city's aging and ineffective storm-sewer system" Nov 2006

"The Big Stick"

..numerous illicit cross connections between the sewer collection and its MS4

..discharged pollutants from its treatment works into navigable waters

..**failed** to conduct representative data collection

..**failed** to conduct on-going field screening

..**failed** to establish and maintain funding to ensure accomplishment of the activities designated

..each day of violation is a separate violation

..violated O&M provisions of permit on each SSO event

..fines of up to **$32,500 per day**

Three Keys to Success
(also the three biggest concerns)

- Adequate Staffing
  - Review & Inspection
  - Reporting
  - Enforcement
- Adequate Funding
- Community Buy-In
  - Citizens
  - Developers
  - Community Leaders

How's it going to happen?

- Regulations
- Enforcement
- Education
- Demonstration
- Risk Taking
- Flexibility
- Compromise
- Co-Permitting
  - KyTC
  - Other MS4s
  - Georgetown College

Program Needs

- Staff
  - SWM Program Manager
  - Administrative Support
  - Maintenance Crew / Operators
  - Inspector
- Equipment
  - Sweepers
  - Vacuum Truck
  - Backhoe
  - Dump Truck / Trailer
  - Pick up trucks
  - Leaf Collection Equipment
- Materials
  - Pipe, Stone, Concrete, Device inserts
  - Publications, Stenciling, clean-up events
  - Computers, copies, office space
- Capital Improvements
  - Drainage Projects
  - Asset Management
  - Mapping updates
- Funding Mechanism
  - Administrative Manager

Current Estimate $850,000 / yr.

How we going to pay for it?

- Taxes
  - Based on property value, not usage
  - Based on income level, not usage
- Grants
  - Undependable
  - Low $$
  - Many programs, such as Section 319, prohibit funding SWM programs with grant $.
- Loans / Bonds
  - Delays the payment; becomes a debt snowball
- Utility / User Fees
  - Based on actual impact to stormwater
  - Acknowledges efforts to lessen impacts

Storm Water Utilities

- Fair and Equitable
- Not based on property value or income
- Based on amount of impervious area, or % of whole
- Defensible
- Based on the Equivalent Rate Unit (ERU)

ERU

- Average Single Family Residence Impervious area is the unit. eg. Assume a typical lot:

Roof Top	**1,000 sq. ft.**
porch	**200 sq. ft.**
driveway	**400 sq. ft.**
sidewalk	**100 sq. ft.**
total	**1800 sq. ft.**

- Commercial Sites - # ERUs. eg. Typical shopping center:

Roof Top	60,000 sq. ft.	
Parking lot	48,000 sq. ft.	
Total	108,000 sq. ft.	108/1.8 = 60 ERU

- Credits Program - % disc. for BMPs (eg. Water Quality Unit, Detention Pond, LID concepts)

Utility Revenue Example

- 8,000 households
- City = 10,500 acres
- 1754 acres impervious in City (includes homes, commercial, streets, etc.)
- Residential Imp. = 330 acres
- Non-Res. Imp. = 1423 acres
- Assuming 50% is roads, public, etc., results in 711 acres commercial impervious or 17200 ERUs
- 17200+8000=25,000 ERU

Utility Revenue Example cont.

$850,000 / year need

850000/25000 = $34 / yr. or $3.00 / mo. per ERU

Typical Single Family household = $3.00 / mo.

Typical Commercial site = 3*60 = $180.00 / mo.*

*without any credits

Upcoming Schedule

- Notice of Intent - July 2007
- SWAC mtgs. Dec. & Jan. to develop Matrix
- Draft Permit Matrix – Jan 2008
- 2008-2013 permit effective July 1, 2008
- Quarterly SWAC meetings
- Annual Reporting – March each year

SUMMARY

- The foundation is laid with ordinance and manual completion
- The storm water program will need to expand from this point
- Keys to the success are:
  - Staffing and resources to implement the plans
  - Adequate review and inspection capabilities
  - Adequate enforcement capabilities

Bottom Line

- Here to stay
- GROWING financial obligation
- No best way – rather, workable solutions for the community
- Creating the plan for the future – it's our choice

Thank You

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Georgetown v. Public Works Growth

- Population
  - 1990 => 11,414 pop.
  - 2005 => 20,000 pop. Est.
  - 2010 => 21,230 pop. Projected
  - 1990 to 2010 => 86% increase (almost doubled)
- Land Mass
  - 1990 => 5533 acres
  - 2007 => 10597 acres
  - 1990 to 2007 => 91% increase (almost doubled)
- Public Work Staff net increase = almost ZERO

SWMP Needs

- WQL unit O&M
  - 50 units every 3mo. x 4hr./unit = 800 hrs.
- Private WQL Inspection
  - 220 units every 3mo. x 1hr./unit = 880 hrs.
- Street Sweeping (10-12 miles / day / sweeper)
  - 54 miles Curb&Gutter City Streets; 34 miles to be dedicated
  - (54+34) = 88 miles Curb and Gutter
  - 88 miles every 2 wks., 10 mo/yr = 1900 miles/ yr.
  - 1900 / 10 miles/day = 190 days/year
- Det. Basin O&M
  - 40 units every 3 mo. x 2hr./unit = 320 hrs.
- Annual S.S. Inspection
  - 237283 ft line. w/ 3405 inlets / yr x 6 inlets/hr. = 568 hrs.
- Leaf Crew
  - 3 man crew full time approx. 2 months/year
- Annual IDDE/Outfall Inspection
  - 237283 ft line x 5000 ft / hr = 47 hrs.
- Annual administration, education, programming, outreach = 1350 hr / yr avg.

SWM needs cont.

- What is full time?
  - Full time = 8hr/d x 5 d/w x 48 w/yr = 1920 hr/yr
  - Full time = 5 d/w x 48 w/yr = 240 days/year
- O&M crew = 1120 hr / yr
- SWM Manager* = 1350 hr / yr
- SWM Inspector* = 1495 hr / yr

  * Full time = 7hr/d x 5 d/w x 48 w/yr = 1680 hr/yr
- Sweep crew = 190 days / yr
- Leaf crew = 2 months/yr, 40 days/yr, or 320 hr/yr

City Engineer's Role in SWMP

- Oversight, Management, Guidance – No time for Production
- Other Engineering Tasks annually
  - Administration – Budgets, Personnel, Bills, Coordination
  - CIPs
    - Police Station, Fire Station, Pool, Cemetery, New Roads
    - Paving, Drainage
    - Manage consultant and the contracts
  - Short and Long Range Planning
    - Committees – BGADD, Traffic, TRC
  - Programming
    - Pavement Asset Management
    - Storm Sewer Asset Management
    - Street lights
  - Streets and Drainage O&M Management
    - Scheduling, Administration, citizen inquiries
    - Street Cut permitting

SWM Equipment Needs (sinking funds)

- O&M
  - Pickup truck with equipment bed = $25,000 / 5 yrs
  - Vac / Jet Tanker Truck = $200,000 / 5 yrs
  - Dump Truck = $65,000 / 5 yrs
  - Backhoe = $100,000 / 5 yrs
  - Trailer = $20,000 / 10 yrs
- Leaf Brush Collection
  - Dump Truck * = $65,000 / 5 yrs

    * Purchase of another garbage truck = $115,000 / 5yrs could allow the conversion of an old truck for leaf service use, reducing the need for an additional Dump Truck.
  - Leaf Vacuum = $15,000 / 5 yrs
- Sweeping
  - 2 Sweepers = $125,000 / 5 yrs each
- Inspection
  - Pickup truck = $20,000 / 5 yrs
  - 2 Arcpad GPS units = $7,500 / 2 yrs for both

Other Street Maintenance Equipment Needs (sinking funds)

- O&M - replacements
  - Pickup trucks (3) = $20,000 / 5 yrs each
    - 2 due for replacement 2008
  - Dump/Salt Trucks (6) = $65,000 / 5 yrs each
    - 3 due for replacement 2008, 3 within next 3-4 yrs
  - Backhoe = $100,000 / 5 yrs
    - Due for replacement 2008
  - Trailer = $25,000 / 10 yrs
    - Due for replacement 5+ yrs
  - Loader = $95,000 / 10 yrs
    - Due for replacement in 1-2 yrs
  - Grader = $120,000 / 10 yrs
    - Due for replacement in 3 yrs
  - Skid Steer = $150,000 / 10 yrs
    - Due for replacement in 3-4 yrs
  - Finishing Roller = $55,000 / 10 yrs
    - Due for replacement in 5+ yrs

Other Street Maintenance Equipment Needs (sinking funds)

- O&M – new purchases
  - Pickup trucks (2) = $20,000 / 5 yrs each
  - Dump/Salt Trucks (1*) = $65,000 / 5 yrs each
  - Bulldozer = $90,000 / 10 yrs
  - Small Paver = $60,000 / 10 yrs
  - Mid weight Roller = $60,000 / 10 yrs
  - Asphalt crack sealing machine = $60,000 / 6-8 yrs

  * Purchase of another garbage truck = $115,000 / 5yrs could allow the conversion of an old truck for leaf service use, reducing the need for an additional Dump Truck.

SWAC Committee Recommendations

- Sandy Camargo – CDP Engineers
- Reggie Greenup – Citizen
- Scott Woodall – Local Contractor
- Lindsey Mosley – Local Developer
- Brent Coombs – Local Engineer
- Brian Hayes – Stormwater Industry
- Terry Thomas – Public Works
- Shelby Jett – KyTC
- Cindy King – Scott Co. NRCS
- Scott Jarvis – Fire / EMA
- Jack Conner – Chamber of Commerce
- Randall Francis – Georgetown College
- Ben Krebs - GSCPC
- Barry Brock - GSCPC
- Steve Glass – City Council
- David Lusby – City Council
- Damon Crutcher - GMWSS
- Eric Larson – Public Works
- Lois Holmes – Parks
- Jim Burgess – B.I.